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NOTICE OF ALLOWANCE AND FEE(S) DUE

40412	7590	03/13/2009

IBM CORPORATION- AUSTIN (JVL)
C/O VAN LEEUWEN & VAN LEEUWEN
PO BOX 90609
AUSTIN, TX 78709-0609

EXAMINER
RAMPURIA, SATISH

ART UNIT	PAPER NUMBER
2191	

DATE MAILED: 03/13/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,908	02/12/2004	Philip Lee Langdale	AUS920030740US1	6084

TITLE OF INVENTION: SYSTEM AND METHOD FOR JIT MEMORY FOOTPRINT IMPROVEMENT FOR EMBEDDED JAVA DEVICES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	06/15/2009

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT.
PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS.
THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON
PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE
MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS
STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES
NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS
PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM
WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW
DUE.**

HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as YES, verify your current
SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown
above.

B. If the status above is to be removed, check box 5b on Part B -
Fee(s) Transmittal and pay the PUBLICATION FEE (if required)
and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now
claiming SMALL ENTITY status, check box 5a on Part B - Fee(s)
Transmittal and pay the PUBLICATION FEE (if required) and 1/2
the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office
(USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b"
of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a
request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing
the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to
Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of
maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

Page 1 of 3

Complete and send this form, together with applicable fee(s), to: <u>Mail</u> **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

| CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address) | Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission. |

| 40412 | 7590 | 03/13/2009 |

IBM CORPORATION- AUSTIN (JVL)
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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

_____ (Depositor's name)

_____ (Signature)

_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,908	02/12/2004	Philip Lee Langdale	AUS920030740US1	6084

TITLE OF INVENTION: SYSTEM AND METHOD FOR JIT MEMORY FOOTPRINT IMPROVEMENT FOR EMBEDDED JAVA DEVICES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	06/15/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
RAMPURIA, SATISH	2191	717-148000

| 1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

 ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

 ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.** | 2. For printing on the patent front page, list

 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. | 1 _____

 2 _____

 3 _____ |

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

| 4a. The following fee(s) are submitted:
 ☐ Issue Fee
 ☐ Publication Fee (No small entity discount permitted)
 ☐ Advance Order - # of Copies _____ | 4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)
 ☐ A check is enclosed.
 ☐ Payment by credit card. Form PTO-2038 is attached.
 ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form). |

| 5. **Change in Entity Status** (from status indicated above)
 ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. | ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2). |

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,908	02/12/2004	Philip Lee Langdale	AUS920030740US1	6084

40412 7590 03/13/2009		

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EXAMINER
RAMPURIA, SATISH

ART UNIT	PAPER NUMBER
2191	

DATE MAILED: 03/13/2009

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 805 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 805 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

	Application No.	Applicant(s)
Notice of Allowability	10/777,908	LANGDALE ET AL.
	Examiner	Art Unit	
	SATISH RAMPURIA	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/13/2008*.

2. ☒ The allowed claim(s) is/are *1-3,6-10,13-16,19 and 20*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

      a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

          1. ☐ Certified copies of the priority documents have been received.

          2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

          3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

     * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____.

DETAILED ACTION

1.   This action is in response to the amendment filed on 12/13/2008.

2.   The rejections under 35 U.S.C. §112 second paragraph to claim 7, 13 and 20 is

withdrawn in view of Applicant's amendment.

3.   Claims 1-3, 6-10, 13-16, 19-20 are allowed.

4.   Claims cancelled by the Applicants: 4, 11, 17.

5.   Claims amended by the Applicants: 7, 13, 20.

Examiner's Amendment

6.   An examiner's amendment to the record appears below. Should the changes and/or

additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than

the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Leslie

Van Leeuwen [Reg. No. 42,196] on February 26th, 2009.

In the claims

Please cancel claims 5, 12, and 18.

Please amend claims 1, 6, 8, 13, 14 and 19 as follows.

Claim 1. (Currently Amended) A computer implemented method of reclaiming memory occupied by Just-in-Time (JIT) compiled programs, said method comprising:

tracking a JIT compiled program, the tracking recording tracking data that includes a method name corresponding to the JIT compiled program and an address range that corresponds to the JIT compiled program;

discarding one or more memory pages included in the address range;

branching to an address included in one of the discarded pages, the branching resulting in a page fault;

retrieving the method name corresponding to the address that resulted in the page fault;

executing a method corresponding to the retrieved method name;

memory mapping the JIT compiled program from a nonvolatile storage location to the address range using a special filesystem;

prior to the discarding, receiving, at the special filesystem, an instruction to write (to nonvolatile storage) the one or more memory pages that are about to be discarded; ~~and~~

returning a response indicating successful completion of the instruction without writing any of the pages to the nonvolatile storage location;

registering an error handler to handle a specific invalid operation code (opcode) prior to discarding any of the memory pages;
in response to the page fault, calling the special filesystem to load the one or more discarded memory pages from the nonvolatile storage location;

writing, by the special filesystem, one or more occurrences of the invalid opcode to one or more of the memory pages that were previously discarded; and

re-branching to the address that caused the page fault, the re-branching resulting
in an invalid opcode exception.

Claim 5. (Cancelled).

Claim 6.

   At line 1, delete [5] and add --1--.

Claim 8. (Currently Amended) An information handling system comprising:

   one or more processors;

   a memory accessible by the processors;

   a nonvolatile storage device accessible by the processors;

   a virtual machine that includes a Just-in-Time (JIT) compiler loaded from the
   nonvolatile storage device to the memory and executed by the processors;

   a memory reclamation tool for reclaiming memory occupied by JIT compiled
   programs, the memory reclamation tool including software code effective to:
        track a JIT compiled program, the tracking including software code effective to record
        tracking data that includes a method name corresponding to the JIT compiled
        program and an address range that corresponds to the JIT compiled program;

   discard one or more memory pages included in the address range;

   branch to an address included in one of the discarded pages resulting in a
   page fault;

   retrieve, from the tracking data, the method name corresponding to the
   address that resulted in the page fault;

   execute a method corresponding to the retrieved method name;

   memory map the JIT compiled program from a nonvolatile storage location
   to the address range using a special filesystem;

prior to the discarding, receive, at the special filesystem, an instruction to write (to the nonvolatile storage device) the one or more memory pages that are about to be discarded; ~~and~~

return a response indicating successful completion of the instruction without writing any of the pages to the nonvolatile storage location;

register an error handler to handle a specific invalid operation code (opcode) prior to discarding any of the memory pages;

in response to the page fault, call the special filesystem to load the one or more discarded memory pages from the nonvolatile storage location;

write, by the special filesystem, one or more occurrences of the invalid opcode to one or more of the memory pages that were previously discarded; and

re-branch to the address that caused the page fault, the re-branch resulting in an invalid opcode exception.

Claim 12. (Cancelled).

Claim 13.

At line 1, delete [12] and add --8--.

Claim 14. (Currently Amended) A computer program product stored on a tangible computer operable media for reclaiming memory occupied by Just-in-Time (JIT) compiled programs, said computer program product including instructions that, when executed by an information handling system, cause the information handling system to perform actions comprising:

tracking a JIT compiled program, the tracking recording tracking data that includes a method name corresponding to the JIT compiled program and an address range that corresponds to the JIT compiled program;

discarding one or more memory pages included in the address range;

branching to an address included in one of the discarded pages, the branching
resulting in a page fault;

retrieving the method name corresponding to the address that resulted in the
page fault;

executing a method corresponding to the retrieved method name;

memory mapping the JIT compiled program from a nonvolatile storage location to
the address range using a special filesystem;

prior to the discarding, receiving, at the special filesystem, an instruction to write
(to nonvolatile storage) the one or more memory pages that are about to be
discarded; ~~and~~

returning a response indicating successful completion of the instruction without
writing any of the pages to the nonvolatile storage location;

registering an error handler to handle a specific invalid operation code (opcode)
prior to discarding any of the memory pages;

in response to the page fault, calling the special filesystem to load the one or
more discarded memory pages from the nonvolatile storage location;

writing, by the special filesystem, one or more occurrences of the invalid opcode
to the memory pages that were previously discarded; and

re-branching to the address that caused the page fault, the re-branching resulting
in an invalid opcode exception.

Claim 18. (Cancelled).

Claim 19.

At line 1, delete [18] and add --14--.

--END--

Reasons for Allowance

7.   The following is an examiner's statement of reasons for allowance:

As pointed out by the Applicants in the Remark that the cited prior art (US Patent No.

2002/0144240 to Lueh et al. and of US Publication No. 2004/0167945 to Garthwaite)

taken alone or in combination fail to teach, in combination with the other claimed

limitations, *branching to an address included in one of the discarded pages, the branching*

resulting in a page fault…registering an error handler to handle a specific invalid operation

code (opcode) prior to discarding any of the memory pages; in response to the page fault,

calling the special filesystem to load the one or more discarded memory pages from the

nonvolatile storage location; writing, by the special filesystem, one or more occurrences of

the invalid opcode to one or more of the memory pages that were previously discarded; and

re-branching to the address that caused the page fault, the re-branching resulting in an

invalid opcode exception as recited in the independent claims 1, 8 and 14.

Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the

issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons

for Allowance."

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Satish S. Rampuria whose telephone number is (571) 272-

3732. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Wei Y. Zhen can be reached on (571) 272-3708. Any inquiry of a general nature

or relating to the status of this application should be directed to the TC 2100 Group

receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status information

for unpublished applications is available through Private PAIR only. For more information

about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access

to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197

(toll-free).

SATISH RAMPURIA
Examiner, Art Unit 2191
/Wei Y Zhen/
Supervisory Patent Examiner, Art Unit 2191